

**PINE HAVEN WATER ASSOCIATION (PWSNO 1090099)
SOURCE WATER ASSESSMENT REPORT**

March 27, 2002



**State of Idaho
Department of Environmental Quality**

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Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This risk assessment is based on a land use inventory in the well recharge zone, sensitivity factors associated with how the well was constructed, and aquifer characteristics.

This report, *Source Water Assessment for Pine Haven Water Association*, describes the public drinking water wells; the well recharge zone and potential contaminant sites located inside the recharge zone boundaries. This assessment, taken into account with local knowledge and concerns, should be used as a planning tool to develop and implement appropriate protection measures for this public water system. **The results should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system.**

Pine Haven Water Association drinking water is supplied by a single 194-foot deep well pumping from the Rathdrum Prairie Aquifer. The water system serves 11 residential connections in rural Bonner County, Idaho, about 4 miles north of Spirit Lake. Historically, Pine Haven Water Association has had few water quality problems. A ground water susceptibility analysis conducted by DEQ January 31, 2002 ranked the well at moderate risk of contamination, mostly because of natural risk factors associated with local geology.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

The Pine Haven Water Association well is located on privately owned land. The lack of a deeded or leased well lot, required for wells drilled after November 1, 1977, makes it difficult for the Association to protect its drinking water source since it has no control over activities around the well. Consequently, retaining a cooperative partnership with the landowner should be the most important well head protection activity on the Association's agenda.

Partnerships with state and local agencies and industry groups should also be established. For example, the Association could put signs up to show where roads enter and leave the well recharge zone so the local highway district will know where to curtail use of road and right-of-way maintenance chemicals. The association should also promote the use of back flow prevention devices in its service area. Back siphonage from stock tanks and automatic irrigation systems during periods of low pressure is a particular concern in a rural neighborhood.

Because 186 public water systems in Idaho draw water from the Rathdrum Prairie Aquifer, they should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. Due to the time involved with the movement of ground water, source water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. For assistance in developing protection strategies, please contact your regional Department of Environmental Quality office or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR PINE HAVEN WATER ASSOCIATION

Section 1. Introduction - Basis for Assessment

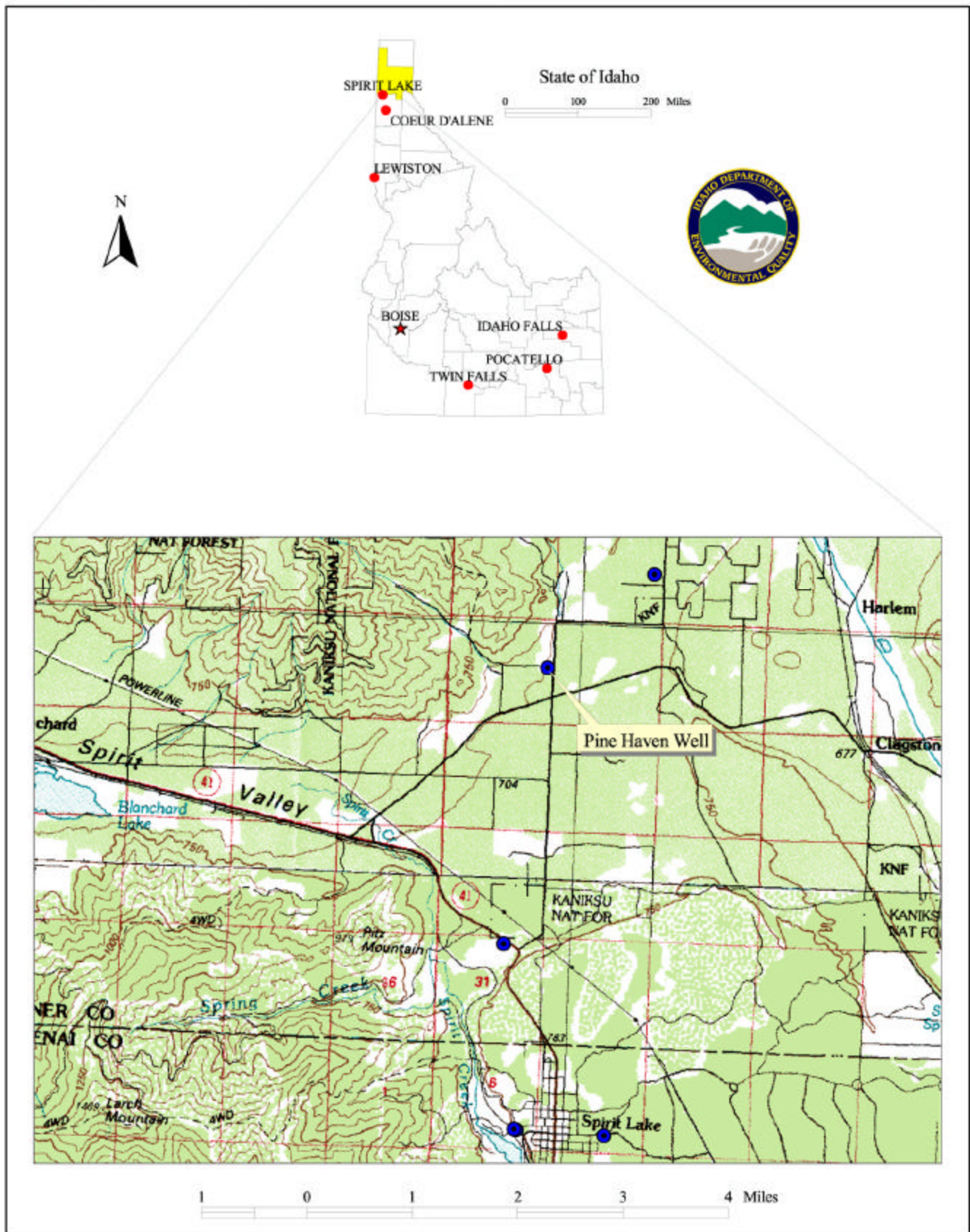
The following sections contain information necessary for understanding how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and an inventory of significant potential sources of contamination identified within that area are included. The ground water susceptibility analysis worksheets used to develop this assessment are attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess every public drinking water source in Idaho for its relative susceptibility to contaminants regulated by the Safe Drinking Water Act. These assessments are based on a land use inventory inside the delineated recharge zones, sensitivity factors associated with how the well is constructed, and aquifer characteristics. The state must complete more than 2900 assessments by May of 2003. Because resources and the time available to accomplish assessments are limited, an in-depth, site-specific investigation for every public water system is not possible.

The results of the source water assessment should not be used as an absolute measure of risk and they should not be used to undermine public confidence in the water system The ultimate goal of this assessment is to provide data to local communities for developing a protection strategy for their drinking water supply. The Idaho Department of Environmental Quality recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a source water protection program should be determined by the local community based on its own needs and limitations. Wellhead or source water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Figure 1. Geographic Location of Pine Haven Water Association



Section 2. Preparing for the Assessment

Defining the Zones of Contribution - Delineation

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes dividing the well recharge area into time of travel zones indicating the number of years necessary for a particle of water to reach a well from the zone boundary. DEQ used a refined computer model approved by the EPA to determine the time of travel (TOT) for water the Pine Haven Water well pumps from the Rathdrum Prairie Aquifer. The computer model used data DEQ assimilated from a variety of sources including local well logs.

Pine Haven Water Association serves a community of 40 people in a rural neighborhood near the boundary between Kootenai and Bonner Counties (Figure 1). A 194-foot deep well producing about 37 GPM supplies drinking water for Pine Haven Water Association customers. The delineated source water assessment area for Pine Haven Water Association encompasses 53.3 acres. On the map, the recharge zone is an oval about 3800 feet long and 650 feet wide. The delineation is divided into 0-3, 3-6 and 6-10 year time of travel zones (Figure 2).

Identifying Potential Sources of Contamination

The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Inventories for public water systems in Idaho were conducted in two-phases. The first phase involved identifying and documenting potential contaminant sources within the Pine Haven Water Association source water assessment areas through the use of computer databases and Geographic Information System maps developed by DEQ. A map showing the delineation and a table summarizing the results of the database search were then sent to system operators for review and correction during the second or enhanced phase of the inventory process

Figure 2, *Pine Haven Water Association Delineation and Potential Contaminant Inventory* on page 7 of this report shows the location of the Pine Haven Water Association well, and the zone of contribution DEQ delineated for it. Roads crossing the delineation boundaries appear to carry low volume local traffic only. Locations of buildings and septic systems relative to the well are not documented. Land use in the recharge zone is a mix of cropland, grazing, undeveloped forest and rural residential.

Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. When a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation.

Section 3. Susceptibility Analysis

The susceptibility to contamination of all groundwater sources in Idaho is being assessed on the following factors:

- physical integrity of the well,
- hydrologic characteristics,
- land use characteristics, and potentially significant contaminant sources
- historic water quality

The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. A high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. The following summaries describe the rationale for the susceptibility ranking. The Susceptibility Analysis Worksheet in Attachment A shows in detail how the Pine Haven Water Association well scored.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. Lower scores imply a well that can better protect the water. This portion of the susceptibility analysis relies on information from individual well logs and from the most recent sanitary survey of the public water system. The well log for the Pine Haven Water Association well is on file with DEQ. The last sanitary survey of the system was conducted in April 1998.

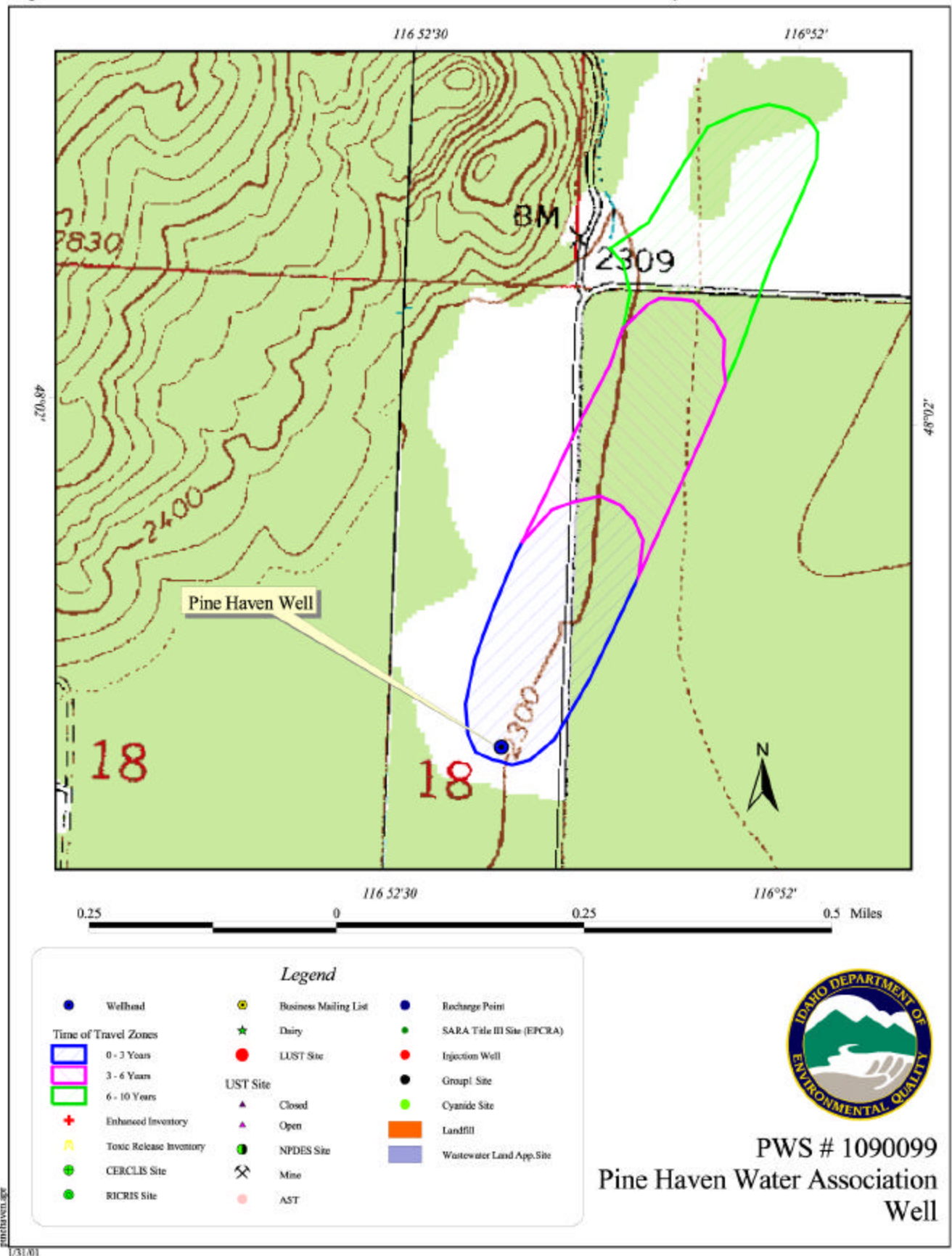
The Pine Haven Water Association system relies on a single well extracting ground water from the Rathdrum Prairie Aquifer. No treatment is required before the water enters the distribution system. The 1998 sanitary survey found the system to be mostly in compliance with *Idaho Rules for Public Drinking Water Systems*. No deficiencies in well seal or wellhead maintenance were observed during the inspection.

The well is 194 feet deep and has an 8-inch steel casing that extends the full depth of the well. The casing is perforated between 174 and 192 feet below the surface. The well is completed in a layer of gravel and sand. The surface seal depth reported on the well log is 19 feet, a foot less than required for drinking water wells in unconsolidated formations by current Idaho Department of Water Resources standards. The seal terminates in a soil layer described as a mixture of gravel and clay. Table 1 summarizes construction and site characteristics for the well.

Table 1. Selected Construction Characteristics of Pine Haven Water Association Well

Well	Total Depth (ft.)	Depth of Surface Seal (ft)	Depth of Casing (ft)	Depth Range of Perforations (ft)	Static Water Level (ft)
Well #1	194	19	194	174-192	168

Figure 2. Pine Haven Water Association Delineation and Potential Contaminant Inventory.



Hydrologic Sensitivity

The hydrologic sensitivity score for the Pine Haven Water Association well was 5 points out 6 points possible. The score reflects natural geologic conditions at the well site and in the recharge zone. The soils in the recharge zone as a whole are moderately well drained. Poorly drained to moderately well drained soils are more protective of ground water than soils that drain faster.

The depth to ground water is less than 300 feet. Gravel mixed with clay predominates in the soil layers between the surface and the water table, but there is no continuous clay layer to retard the vertical transport of contaminants.

Potential Contaminant Sources and Land Use

Land use within The Pine Haven Water Association well recharge zone a mix of cropland, grazing undeveloped forest and rural residential. Roads near the well and crossing the delineation boundaries appear to carry a low volume of local traffic, with little potential for spills from vehicles carrying hazardous materials or petroleum products. The exact location of homes and septic systems relative to the well is not documented in the public water system file but the file notes that required setbacks from the well have been met.

Historic Water Quality

Historically, Pine Haven Water Association has had few water quality problems. The system tests quarterly for bacterial contamination. Total coliform bacteria present in samples tested in January 2001 were probably due to a distribution line break. Samples tested since then have been negative.

Nitrate detections in Pine Haven water samples have been in the range of 0.338 to 0.5 mg/l. The Maximum Contaminant Level (MCL) is 10.0 mg/l. The water was tested for other inorganic chemical constituents in 1997 with the following results:

- Fluoride (MCL = 4.0mg/l) 0.3 mg/l.
- Sodium 4.58 mg/l.
- Sulfate 9.6 mg/l.

Radiological contaminants in concentrations below the MCL were present when the water was tested in 1993 and 1997. Synthetic organic compounds (SOCs) and volatile organic compounds (VOCs) have never been detected in Pine Haven water and the system has been granted waivers to reduce SOC monitoring.

Final Susceptibility Ranking

The Pine Haven Water Association well ranked moderately susceptible to all classes of regulated contaminants. Natural risk factors associated with the geology of the Rathdrum Prairie Aquifer added the most points to the final susceptibility scores. Total scores in each category are summarized on Table 2. The complete analysis worksheet for the well is in Attachment A.

The final scores for the susceptibility analysis were determined using the following formulas:

- 1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)
- 2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

The final ranking categories are as follows:

- 0 - 5 Low Susceptibility
- 6 - 12 Moderate Susceptibility
- > 13 High Susceptibility

Table 2. Summary of Pine Haven Water Association Susceptibility Evaluation

Cumulative Susceptibility Scores						
Well Name	System Construction	Hydrologic Sensitivity	Contaminant Inventory			
			IOC	VOC	SOC	Microbial
Well #1	3	5	3	3	3	2
Final Susceptibility Score/Ranking						
	IOC	VOC	SOC	Microbial		
Well #1	9/Moderate	9/Moderate	9/Moderate	9/Moderate		

IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

*High - Indicates source automatically scored as high susceptibility due to presence of a VOC or SOC; or the presence of an IOC above the maximum contaminant level in the tested drinking water, or the repeated presence of bacteria in wellhead samples.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require education and surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local area. The state and local health districts have instituted enhanced protection of the ground water in the Rathdrum Prairie Aquifer because of its high use and uniquely pristine water quality. The protections are generally aquifer wide and are not aimed at zones of contribution to a specific well or water system. *The Spokane Valley-Rathdrum Prairie Atlas*, sent to water systems on the prairie when they were invited to perform an enhanced contaminant inventory, describes some of the regional protection measures.

The 186 public water systems in Idaho that draw water from the Rathdrum Prairie Aquifer should consider forming a regional group to represent their interests before state, county and municipal governing bodies when regulatory tools like zoning overlays, or enactment of building codes are the most appropriate ground water protection measures. These types of measures could be used to protect the capture zones of a specific system or group of wells that could be put at risk from local land use changes.

The Pine Haven Water Association well is located in a locked concrete well house on privately owned land. The well house is heated and drained. The lack of a deeded or leased well lot, required for wells drilled after November 1, 1977, makes it difficult for the Association to protect its drinking water source since it has no control over activities around the well. Consequently, retaining a cooperative partnership with the landowner should be the most important well head protection activity on the Association's agenda. Fortunately, fencing the area around the well is not required because no livestock are grazed nearby. Required setbacks from septic systems and other potential ground water contaminants have been met. Maintenance practices for the landscaping near the well should be reviewed periodically to ensure that agricultural chemicals and irrigation water are not applied within 50 feet of the well.

The Association should promote the use of back flow prevention devices in its service area. Back siphonage from stock tanks and automatic irrigation systems during periods of low pressure is a particular concern in a rural neighborhood.

Partnerships with state and local agencies and industry groups should also be established. For example, the association could put up signs to show where roads enter and leave the recharge zone so the local highway district will know where to reduce or eliminate the use of dust abatement compounds or herbicides for noxious weed control.

Due to the time involved with the movement of ground water, wellhead protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term.

Assistance

Public water suppliers and users may call the following IDEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the IDEQ office for preliminary review and comments.

Coeur d'Alene Regional DEQ Office (208) 769-1422

State IDEQ Office (208) 373-0502

Website: <http://www.deq.state.id.us>

Water suppliers serving fewer than 10,000 persons may contact John Bokor, Idaho Rural Water Association, at (208) 343-7001 for assistance with wellhead protection strategies.

References Cited

Great Lakes-Upper Mississippi River Board of State and Provincial Public Health and Environmental Managers, 1997. "Recommended Standards for Water Works."

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Natural Resource Conservation Service, 1991. Idaho Snake-Payette Rivers Hydrologic Unit Plan of Work. March 1991.

United States Geological Survey, 1986. Quality of Ground Water in the Payette River Basin, Idaho. United States Geological Survey. Water Resources Investigation Report 86-4013.

University of Idaho. 1986. Ground Water Resources in a Portion of Payette County, Idaho. Idaho Water Resources Research Institute. University of Idaho. Moscow, Idaho. April 1986.

Attachment A

Pine Haven Water Association Susceptibility Analysis Worksheet

Ground Water Susceptibility

Public Water System Name : **PINE HAVEN WATER ASSN**
 Public Water System Number : **1090099**

Source: **WELL #1**
 1/31/02 8:29:36 AM

1. System Construction		SCORE			
Drill Date	2/1/74				
Driller Log Available	YES				
Sanitary Survey (if yes, indicate date of last survey)	YES 1998				
Well meets IDWR construction standards	YES	0			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		3			
2. Hydrologic Sensitivity					
Soils are moderately drained	YES	1			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		5			
3. Potential Contaminant / Land Use - ZONE 1A (Sanitary Setback)		IOC	VOC	SOC	Microbial
		Score	Score	Score	Score
Land Use Zone 1A	DRYLAND AGRICULTURE	1	1	1	1
Farm chemical use high	NO	0	0	0	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		1	1	1	1
Potential Contaminant / Land Use - ZONE 1B (3 YR. TOT)					
Contaminant sources present (Number of Sources)	NO	0	0	0	0
(Score = # Sources X 2) 8 Points Maximum		0	0	0	0
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
4 Points Maximum		0	0	0	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	25 to 50% Non-Irrigated Agricultural	1	1	1	1
Total Potential Contaminant Source / Land Use Score - Zone 1B		1	1	1	1
Potential Contaminant / Land Use - ZONE II (6 YR. TOT)					
Contaminant Sources Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Land Use Zone II	Less than 25% Agricultural Land	0	0	0	
Potential Contaminant Source / Land Use Score - Zone II		0	0	0	0
Potential Contaminant / Land Use - ZONE III (10 YR. TOT)					
Contaminant Source Present	NO	0	0	0	
Sources of Class II or III leacheable contaminants or Microbials	NO	0	0	0	
Agricultural lands occupy > 50% of Zone III	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		1	1	1	0
Cumulative Potential Contaminant / Land Use Score		3	3	3	2
4. Final Susceptibility Source Score		9	9	9	9
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate

POTENTIAL CONTAMINANT INVENTORY

LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.)

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25 % of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.